ACCESSION NUMBER: 2006:710890 CAPLUS
DOCUMENT NUMBER: 145:161779
TITLE: Fibrous protein fusions with mineralization domains and use in the formation of advanced organic/inorganic composite materials
INVENTOR(S): Kaplan, David L.; Huang, Jia; Wong Po Foo, Cheryl; Naik, Rajesh; George, Anne
PATENT ASSIGNEE(S): Trustees of Tufts College, USA; United States of America as Represented by the Secretary of the Air Force; The Board of Trustees of the University of Illinois
SOURCE: PCT Int. Appl., 55 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2006076711	A2	20060720	WO 2006-US1536	20060117

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

PRIORITY APPLN. INFO.: US 2005-644264P P 20050114

AB The claimed invention provides a fusion polypeptide comprising a fibrous protein domain and a mineralization domain, and the resulting fusion protein used to form an organic-inorg. composite. Thus, the R5 peptide (SSKKSGSYSGSKGSKRRIL) of silaffin-1 from Cylindrotheca fusiformis is genetically fused to a 15-mer of the consensus repeat unit (SGRGGLGGQGAGAAAAAGGAGQGGYGGLGSQGT with CRGD linker) of spidroin 1 from the golden orb spider Nephila clavipes. The purpose of fusing this silicification-inducing peptide unit to genetically engineered silk is to combine the properties of the silk whether in the form of films or other such spun fibers to the silica-precipitating properties of R5 under ambient conditions to produce biomaterials with controlled silica morphologies on the surface. Silicification reactions using tetraethoxysilane on synthetic spider silk protein films yielded spherical silica structures with diams. ranging from .apprx.0.5-2.0 μm only when the silica precipitating domain, R5 peptide, was fused to the C-terminus of the silk proteins. These organic-inorg. composites can be constructed from the nano- to the macro-scale depending on the size of the fibrous protein fusion domain used. The composites can also be loaded with other compds. (e.g., dyes, drugs, enzymes) depending on the goal for the materials, to further enhance function. This can be achieved during assembly of the material or during the mineralization step in materials formation.

L6 ANSWER 2 OF 3 CAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2005:394700 CAPLUS
DOCUMENT NUMBER: 142:428879
TITLE: Entrapment of biomolecules and inorganic nanoparticles by biosilicification
INVENTOR(S): Naik, Rajesh R.; Stone, Morley O.; Spain, Jim C.; Luckarift, Heather R.

PATENT ASSIGNEE(S): USA
SOURCE: U.S. Pat. Appl. Publ., 16 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005095690	A1	20050505	US 2004-803633	20040318
PRIORITY APPLN. INFO.:			US 2003-517227P P	20031031

AB A method of immobilizing ≥1 mol. in a silica matrix to form a biosilicification product. The mol. may be immobilized in the silica matrix at substantially the same time as the silica matrix is formed. The method comprises combining ≥1 silaffin polypeptide, ≥1 mol., and ≥1 hydroxylated water-soluble derivative to form the biosilicification product. The silaffin polypeptide may be Sil1 protein from Cylindrotheca fusiformis, a fragment of the Sil1 protein, poly-L-lysine, or a synthetic polypeptide having affinity for silica. The mol. may be an enzyme, a protein, a polypeptide, an antibody, an antigen, poly(nucleic) acids, microbial cells, plant cells, or animal cells. The hydroxylated water-soluble derivative may be silicic acid.

L6 ANSWER 3 OF 3 CAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2004:79316 CAPLUS
DOCUMENT NUMBER: 140:402326
TITLE: Enzyme immobilization in a biomimetic silica support
AUTHOR(S): Luckarift, Heather R.; Spain, Jim C.; Naik, Rajesh R.; Stone, Morley O.
CORPORATE SOURCE: Air Force Research Laboratory, Airbase Technologies Division, Suite #2, Tyndall Air Force Base, FL, 32403-5323, USA
SOURCE: Nature Biotechnology (2004), 22(2), 211-213
CODEN: NABIF9; ISSN: 1087-0156
PUBLISHER: Nature Publishing Group
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Robust immobilization techniques that preserve the activity of biomols. have many potential applications. Silicates, primarily in the form of sol-gel composites or functionalized mesoporous silica, have been used to encapsulate a wide variety of biomols. but the harsh conditions required for chemical synthesis limit their applicability. Silaffin polypeptides from diatoms catalyze the formation of silica in vitro at neutral pH and ambient temperature and pressure. Here we show that butyrylcholinesterase entrapped during the precipitation of silica nanospheres retained all of its activity. Ninety percent of the soluble enzyme was immobilized, and the immobilized enzyme was substantially more stable than the free enzyme. The mech. properties of silica nanospheres facilitated application in a flow-through reactor. The use of biosilica for enzyme immobilization combines the excellent support properties of a silica matrix with a benign immobilization method that retains enzyme activity.

REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

=> d ibib abs l7 1-14

L7 ANSWER 1 OF 14 MEDLINE on STN
ACCESSION NUMBER: 2004496677 MEDLINE
DOCUMENT NUMBER: PubMed ID: 15304518
TITLE: Silica morphogenesis by alternative processing of silaffins in the diatom Thalassiosira pseudonana.
AUTHOR: Poulsen Nicole; Kroger Nils
CORPORATE SOURCE: Lehrstuhl Biochemie I, Universitatsstr. 31, Universitat Regensburg, 93053 Regensburg, Germany.
SOURCE: The Journal of biological chemistry, (2004 Oct 8) Vol. 279, No. 41, pp. 42993-9. Electronic Publication: 2004-08-10. Journal code: 2985121R. ISSN: 0021-9258.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE) (RESEARCH SUPPORT, NON-U.S. GOV'T)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-AY706749; GENBANK-AY706750; GENBANK-AY706751
ENTRY MONTH: 200411
ENTRY DATE: Entered STN: 7 Oct 2004
Last Updated on STN: 19 Dec 2004
Entered Medline: 24 Nov 2004

AB For almost 200 years scientists have been fascinated by the ornate cell walls of the diatoms. These structures are made of amorphous silica, exhibiting species-specific, mostly porous patterns in the nano- to micrometer range. Recently, from the diatom Cylindrotheca fusiformis unusual phosphoproteins (termed silaffins) and long chain polyamines have been identified and implicated in biosilica formation. However, analysis of the role of silaffins in morphogenesis of species-specific silica structures has so far been hampered by the difficulty of obtaining structural data from these extremely complex proteins. In the present study, the five major silaffins from the diatom Thalassiosira pseudonana (tpSil1H, -1L, -2H, -2L, and -3) have been isolated, functionally analyzed, and structurally characterized, mak- ing use of the recently available genome data from this organism. Surprisingly, the silaffins of T. pseudonana and C. fusiformis share no sequence homology but are similar regarding amino acid composition and post-translational modifications. Silaffins tpSil1H and -2H are higher molecular mass isoforms of tpSil1L and -2L, respectively, generated in vivo by alternative processing of the same precursor polypeptides. Interestingly, only tpSil1H and -2H but not tpSil1L and -2L induce the formation of porous silica patterns in vitro, suggesting that the alternative processing event is an important step in morphogenesis of T. pseudonana biosilica.

L7 ANSWER 2 OF 14 BIOSIS COPYRIGHT (c) 2007 The Thomson Corporation on STN
ACCESSION NUMBER: 2005:14060 BIOSIS
DOCUMENT NUMBER: PREV200500015265
TITLE: Silica morphogenesis by alternative processing of silaffins in the diatom Thalassiosira pseudonana.
AUTHOR(S): Poulsen, Nicole; Kroeger, Nils [Reprint Author]
CORPORATE SOURCE: Lehrstuhl Biochem 1, Univ Regensburg, Univ Str 31, D-93053, Regensburg, Germany
nils.kroeger@vkl.uni-regensburg.de
SOURCE: Journal of Biological Chemistry, (October 8 2004) Vol. 279, No. 41, pp. 42993-42999, 42984. print.
CODEN: JBCHA3. ISSN: 0021-9258.
DOCUMENT TYPE: Article
LANGUAGE: English
ENTRY DATE: Entered STN: 22 Dec 2004
Last Updated on STN: 22 Dec 2004

AB For almost 200 years scientists have been fascinated by the ornate cell walls of the diatoms. These structures are made of amorphous silica, exhibiting species-specific, mostly porous patterns in the

nano- to micrometer range. Recently, from the diatom Cylindrotheca fusiformis unusual phosphoproteins (termed silaffins) and long chain polyamines have been identified and implicated in biosilica formation. However, analysis of the role of silaffins in morphogenesis of species-specific silica structures has so far been hampered by the difficulty of obtaining structural data from these extremely complex proteins. In the present study, the five major silaffins from the diatom Thalassiosira pseudonana (tpSil1H, - 1L, - 2H, - 2L, and - 3) have been isolated, functionally analyzed, and structurally characterized, making use of the recently available genome data from this organism. Surprisingly, the silaffins of T. pseudonana and C. fusiformis share no sequence homology but are similar regarding amino acid composition and posttranslational modifications. Silaffins tpSil1H and - 2H are higher molecular mass isoforms of tpSil1L and - 2L, respectively, generated in vivo by alternative processing of the same precursor polypeptides. Interestingly, only tpSil1H and - 2H but not tpSil1L and - 2L induce the formation of porous silica patterns in vitro, suggesting that the alternative processing event is an important step in morphogenesis of T. pseudonana biosilica.

L7 ANSWER 3 OF 14 BIOSIS COPYRIGHT (c) 2007 The Thomson Corporation on STN
ACCESSION NUMBER: 2002:508051 BIOSIS
DOCUMENT NUMBER: PREV200200508051
TITLE: Synthesis of silica nanostructures at neutral pH using catalytic polypeptides.
AUTHOR(S): Clarson, Stephen J. [Reprint author]; Whitlock, Patrick William; Patwardhan, Siddharth V. [Reprint author]; Brott, Lawrence L.; Naik, Rajesh R.; Stone, Morley O.
CORPORATE SOURCE: Department of Materials Science and Engineering, University of Cincinnati, 492 Rhodes Hall, Cincinnati, OH, 45221-0012, USA
sclarson@uceng.uc.edu
SOURCE: Abstracts of Papers American Chemical Society, (2002) Vol. 223, No. 1-2, pp. PMSE 231. print.
Meeting Info.: 223rd National Meeting of the American Chemical Society. Orlando, FL, USA. April 07-11, 2002.
CODEN: ACSRAL. ISSN: 0065-7727.
DOCUMENT TYPE: Conference; (Meeting)
Conference; Abstract; (Meeting Abstract)
LANGUAGE: English
ENTRY DATE: Entered STN: 2 Oct 2002
Last Updated on STN: 2 Oct 2002

L7 ANSWER 4 OF 14 CAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2006:710890 CAPLUS
DOCUMENT NUMBER: 145:161779
TITLE: Fibrous protein fusions with mineralization domains and use in the formation of advanced organic/inorganic composite materials
INVENTOR(S): Kaplan, David L.; Huang, Jia; Wong Po Foo, Cheryl; Naik, Rajesh; George, Anne
PATENT ASSIGNEE(S): Trustees of Tufts College, USA; United States of America as Represented by the Secretary of the Air Force; The Board of Trustees of the University of Illinois
SOURCE: PCT Int. Appl., 55 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE

WO 2006076711	A2	20060720	WO 2006-US1536	20060117

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

PRIORITY APPLN. INFO.: US 2005-644264P P 20050114

AB The claimed invention provides a fusion polypeptide comprising a fibrous protein domain and a mineralization domain, and the resulting fusion protein used to form an organic-inorg. composite. Thus, the R5 peptide (SSKKSGSYSGSKGSKRRIL) of silaffin-1 from Cylindrotheca fusiformis is genetically fused to a 15-mer of the consensus repeat unit (SGRGGLGGQGAGAAAAAGGAGQGGYGGLGSQGT with CRGD linker) of spidroin 1 from the golden orb spider Nephila clavipes. The purpose of fusing this silicification-inducing peptide unit to genetically engineered silk is to combine the properties of the silk whether in the form of films or other such spun fibers to the silica-precipitating properties of R5 under ambient conditions to produce biomaterials with controlled silica morphologies on the surface. Silicification reactions using tetraethoxysilane on synthetic spider silk protein films yielded spherical silica structures with diams. ranging from .apprx.0.5-2.0 μm only when the silica precipitating domain, R5 peptide, was fused to the C-terminus of the silk proteins. These organic-inorg. composites can be constructed from the nano- to the macro-scale depending on the size of the fibrous protein fusion domain used. The composites can also be loaded with other compds. (e.g., dyes, drugs, enzymes) depending on the goal for the materials, to further enhance function. This can be achieved during assembly of the material or during the mineralization step in materials formation.

L7 ANSWER 5 OF 14 CAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2005:394700 CAPLUS
DOCUMENT NUMBER: 142:428879
TITLE: Entrapment of biomolecules and inorganic nanoparticles by biosilicification
INVENTOR(S): Naik, Rajesh R.; Stone, Morley O.; Spain, Jim C.; Luckarift, Heather R.
PATENT ASSIGNEE(S): USA
SOURCE: U.S. Pat. Appl. Publ., 16 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2005095690	A1	20050505	US 2004-803633	20040318

PRIORITY APPLN. INFO.: US 2003-517227P P 20031031

AB A method of immobilizing ≥1 mol. in a silica matrix to form a biosilicification product. The mol. may be immobilized in the silica matrix at substantially the same time as the silica matrix is formed. The method comprises combining ≥1 silaffin polypeptide, ≥1 mol., and ≥1 hydroxylated water-soluble derivative to form the biosilicification product. The

silaffin polypeptide may be Sil1 protein from Cylindrotheca fusiformis, a fragment of the Sil1 protein, poly-L-lysine, or a synthetic polypeptide having affinity for silica. The mol. may be an enzyme, a protein, a polypeptide, an antibody, an antigen, poly(nucleic) acids, microbial cells, plant cells, or animal cells. The hydroxylated water-soluble derivative may be silicic acid.

L7 ANSWER 6 OF 14 CAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2004:807360 CAPLUS
DOCUMENT NUMBER: 142:1518
TITLE: Silica Morphogenesis by Alternative Processing of Silaffins in the Diatom Thalassiosira pseudonana
AUTHOR(S): Poulsen, Nicole; Kroeger, Nils
CORPORATE SOURCE: Lehrstuhl Biochemie I, Universitaet Regensburg, Regensburg, 93053, Germany
SOURCE: Journal of Biological Chemistry (2004), 279(41), 42993-42999
CODEN: JBCHA3; ISSN: 0021-9258
PUBLISHER: American Society for Biochemistry and Molecular Biology
DOCUMENT TYPE: Journal
LANGUAGE: English
AB For almost 200 yr scientists have been fascinated by the ornate cell walls of the diatoms. These structures are made of amorphous silica, exhibiting species-specific, mostly porous patterns in the nano- to micrometer range. Recently, from the diatom Cylindrotheca fusiformis unusual phosphoproteins (termed silaffins) and long chain polyamines have been identified and implicated in biosilica formation. However, anal. of the role of silaffins in morphogenesis of species-specific silica structures has so far been hampered by the difficulty of obtaining structural data from these extremely complex proteins. In the present study, the five major silaffins from the diatom Thalassiosira pseudonana (tpSil1H, -1L, -2H, -2L, and -3) have been isolated, functionally analyzed, and structurally characterized, making use of the recently available genome data from this organism. Surprisingly, the silaffins of T. pseudonana and C. fusiformis share no sequence homol. but are similar regarding amino acid composition and post- translational modifications. Silaffins tpSil1H and -2H are higher mol. mass isoforms of tpSil1L and -2L, resp., generated in vivo by alternative processing of the same precursor polypeptides. Interestingly, only tpSil1H and -2H but not tpSil1L and -2L induce the formation of porous silica patterns in vitro, suggesting that the alternative processing event is an important step in morphogenesis of T. pseudonana biosilica.
REFERENCE COUNT: 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 7 OF 14 CAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2004:79316 CAPLUS
DOCUMENT NUMBER: 140:402326
TITLE: Enzyme immobilization in a biomimetic silica support
AUTHOR(S): Luckarift, Heather R.; Spain, Jim C.; Naik, Rajesh R.; Stone, Morley O.
CORPORATE SOURCE: Air Force Research Laboratory, Airbase Technologies Division, Suite #2, Tyndall Air Force Base, FL, 32403-5323, USA
SOURCE: Nature Biotechnology (2004), 22(2), 211-213
CODEN: NABIF9; ISSN: 1087-0156
PUBLISHER: Nature Publishing Group
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Robust immobilization techniques that preserve the activity of biomols. have many potential applications. Silicates, primarily in the form of sol-gel composites or functionalized mesoporous silica, have been used to encapsulate a wide variety of biomols. but the harsh conditions required for chemical synthesis limit their applicability. Silaffin polypeptides from diatoms catalyze the formation of silica in vitro at neutral pH and ambient temperature and pressure. Here we show that butyrylcholinesterase entrapped during the precipitation of silica nanospheres retained all of its activity. Ninety percent of the soluble enzyme was immobilized, and the immobilized enzyme was substantially more stable than the free enzyme. The mech. properties of silica nanospheres facilitated application in a flow-through reactor. The use of biosilica for enzyme immobilization combines the excellent support properties of a silica matrix with a benign immobilization method that retains enzyme activity.

REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 8 OF 14 CAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:896469 CAPLUS
DOCUMENT NUMBER: 138:238701
TITLE: Silicification and Biosilicification. Part 4. Effect of Template Size on the Formation of Silica
AUTHOR(S): Patwardhan, Siddharth V.; Clarson, Stephen J.
CORPORATE SOURCE: Department of Materials Science and Engineering, University of Cincinnati, Cincinnati, OH, 45221-0012, USA
SOURCE: Journal of Inorganic and Organometallic Polymers (2002), 12(3/4), 109-116
CODEN: JIOPE4; ISSN: 1053-0495
PUBLISHER: Kluwer Academic/Plenum Publishers
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Silicification at neutral pH and under ambient conditions is of growing interest due to its close relationship with biosilicification. In diatoms biosilicification has been reported to occur at (or close to) neutral pH and it has been shown that protein mols. act as catalysts/templates/scaffolds for this elegant materials chemical In this investigation various catalysts/templates have been studied for their role in silicification in vitro. We have used functionalized C60 fullerene, R5 (an important polypeptide from the amino acid sequence of a silaffin protein), poly-l-lysine (PLL) and two poly(allylamine hydrochloride) (PAH) samples having different mol. wts. An aqueous silica precursor was used and ordered silica structures were produced in each of the systems studied. The sizes of the silica structures appear to correlate with the size, in solution, of the templating/scaffolding agents. Biol. systems exhibit hierarchical structures with remarkable control of morphologies over different length scales. The use of templating/scaffolding agents having different sizes and shapes is one possible paradigm for the production of such structures in vivo.

REFERENCE COUNT: 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 9 OF 14 CAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2002:232433 CAPLUS
TITLE: Synthesis of silica nanostructures at neutral Ph using catalytic polypeptides
AUTHOR(S): Clarson, Stephen J.; Whitlock, Patrick W.; Patwardhan, Siddharth V.; Brot, Lawrence L.; Naik, Rajesh R.; Stone, Morley O.
CORPORATE SOURCE: Department of Materials Science and Engineering, University of Cincinnati, Cincinnati, OH, 45221-0012, USA

SOURCE: PMSE Preprints (2002), 86, 81
CODEN: PPMRA9; ISSN: 1550-6703
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal; (computer optical disk)
LANGUAGE: English
AB Marine diatoms and sponges are capable of forming beautiful silica nanostructures in vivo. Silaffin proteins have recently been isolated from the marine diatom Cylindrotheca fusiformis and have been shown to generate silica spheres when added to solns. of silicic acid in vitro. We report here a variety of silica structures and inorg.-organic hybrid materials that have been prepared using synthetic peptide sequences derived from the Sil1 gene of Cylindrotheca fusiformis. We are also exploring synthetic polymers that can mimic the catalytic/templating function of these biol. derived systems.
REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L7 ANSWER 10 OF 14 CAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2002:191815 CAPLUS
TITLE: Synthesis of silica nanostructures at neutral pH using catalytic polypeptides
AUTHOR(S): Clarson, Stephen J.; Whitlock, Patrick William; Patwardhan, Siddharth V.; Brott, Lawrence L.; Naik, Rajesh R.; Stone, Morley O.
CORPORATE SOURCE: Department of Materials Science and Engineering, University of Cincinnati, Cincinnati, OH, 45221-0012, USA
SOURCE: Abstracts of Papers, 223rd ACS National Meeting, Orlando, FL, United States, April 7-11, 2002 (2002), PMSE-231. American Chemical Society: Washington, D. C.
CODEN: 69CKQP
DOCUMENT TYPE: Conference; Meeting Abstract
LANGUAGE: English
AB Marine diatoms and sponges are capable of forming beautiful silica nanostructures in vivo. Silaffin proteins have recently been isolated from the marine diatom Cylindrotheca fusiformis and have been shown to generate silica spheres when added to solns. of silicic acid in vitro. We report here a variety of silica structures and inorg.-organic hybrid materials that have been prepared using synthetic peptide sequences derived from the Sil1 gene of Cylindrotheca fusiformis. We are also exploring synthetic polymers that can mimic the catalytic / templating function of these biol. derived systems.

L7 ANSWER 11 OF 14 CAPLUS COPYRIGHT 2007 ACS on STN
ACCESSION NUMBER: 2001:200992 CAPLUS
TITLE: Biocatalysis of silica nanostructures
AUTHOR(S): Whitlock, Patrick W.; Brott, Lawrence L.; Clarson, Stephen J.; Naik, Rajesh R.; Stone, Morley O.
CORPORATE SOURCE: Materials Science and Engineering, The Polymer Research Group / Materials and Manufacturing Directorate, University of Cincinnati / Air Force Research Laboratory, Cincinnati, OH, 45221-0018, USA
SOURCE: Abstracts of Papers, 221st ACS National Meeting, San Diego, CA, United States, April 1-5, 2001 (2001) IEC-321
CODEN: 69FZD4
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal; Meeting Abstract
LANGUAGE: English
AB Numerous examples of nanopatterning and nanostructure are commonly found in nature, most apparent in the marine diatoms and sponges. In vivo biosilification allows these organisms to control structural morphol. at the nanometer level. Understanding how nature performs this exquisite

control and duplicating this process has numerous applications in materials science. Silaffins, a set of cationic polypeptides isolated from the diatom Cylindrotheca fusiformis, can generate a network of silica nanospheres when added to a solution of silicic acid in vitro. Using a short synthetic peptide derived from the Silaffin 1 (Sil1) protein of C. fusiformis, we produced a variety of silica nanostructures. The produced structures range in morphol. from common spheres to highly organized and complex fibrillar geometries that display remarkable organization at the nanometer size-scale. We are currently investigating the mol. orientation present in these morphologies and developing new methods to control the deposition of silica for nanoapplications.

L7 ANSWER 12 OF 14 LIFESCI COPYRIGHT 2007 CSA on STN
ACCESSION NUMBER: 2005:92539 LIFESCI
TITLE: Silica Morphogenesis by Alternative Processing of Silaffins in the Diatom Thalassiosira pseudonana
AUTHOR: Poulsen, Nicole; Kroeger, Nils
CORPORATE SOURCE: Lehrstuhl Biochemie I, Universitaetsstr. 31, Universitaet Regensburg, 93053 Regensburg, Germany
SOURCE: Journal of Biological Chemistry [J. Biol. Chem.], (20041008) vol. 279, no. 41, pp. 42993-42999.
ISSN: 0021-9258.
DOCUMENT TYPE: Journal
FILE SEGMENT: K
LANGUAGE: English
SUMMARY LANGUAGE: English
AB For almost 200 years scientists have been fascinated by the ornate cell walls of the diatoms. These structures are made of amorphous silica, exhibiting species-spe- cific, mostly porous patterns in the nano- to micrometer range. Recently, from the diatom Cylindrotheca fusifor- mis unusual phosphoproteins (termed silaffins) and long chain polyamines have been identified and impli- cated in biosilica formation. However, analysis of the role of silaffins in morphogenesis of species-specific sil- ica structures has so far been hampered by the difficulty of obtaining structural data from these extremely com- plex proteins. In the present study, the five major silaf- fins from the diatom Thalassiosira pseudonana (tpSil1H, -1L, -2H, -2L, and -3) have been isolated, func- tionally analyzed, and structurally characterized, mak- ing use of the recently available genome data from this organism. Surprisingly, the silaffins of T. pseudonana and C. fusiformis share no sequence homology but are similar regarding amino acid composition and post- translational modifications. Silaffins tpSil1H and -2H are higher molecular mass isoforms of tpSil1L and -2L, respectively, generated in vivo by alternative processing of the same precursor polypeptides. Interestingly, only tpSil1H and -2H but not tpSil1L and -2L induce the for- mation of porous silica patterns in vitro, suggesting that the alternative processing event is an important step in morphogenesis of T. pseudonana biosilica.

L7 ANSWER 13 OF 14 EMBASE COPYRIGHT (c) 2007 Elsevier B.V. All rights reserved on STN
ACCESSION NUMBER: 2005168410 EMBASE
TITLE: Prospects in diatom research.
AUTHOR: Lopez P.J.; Descles J.; Allen A.E.; Bowler C.
CORPORATE SOURCE: P.J. Lopez, CNRS FRE-2910 Signalisation M., Ecole Normale Superieure, 46 rue d'Ulm, 75005 Paris, France. pjlopez@biologie.ens.fr
SOURCE: Current Opinion in Biotechnology, (2005) Vol. 16, No. 2, pp. 180-186. .
Refs: 53
ISSN: 0958-1669 CODEN: CUOBE3
COUNTRY: United Kingdom

DOCUMENT TYPE: Journal; General Review
FILE SEGMENT: 004 Microbiology
LANGUAGE: English
SUMMARY LANGUAGE: English
ENTRY DATE: Entered STN: 12 May 2005
Last Updated on STN: 12 May 2005

AB Diatoms are unicellular photosynthetic eukaryotes that play a major role in the global cycling of carbon and silicon. They are believed to have arisen from a secondary endosymbiotic event between two eukaryotes, a red alga and a flagellated heterotroph. Recent analysis of a diatom genome indeed reveals a 'mosaic' nature, with genes derived from plant, animal and bacterial lineages. Advances in molecular genomics are facilitating the use of diatom-specific genes or pathways for biotechnology. Another interest is in understanding the artistry of the amorphous silica shell and the underlying biomineralization process. Materials scientists and chemists are now exploiting diatoms to develop new biomimetic approaches and to create silicon-based microdevices with specific features.

L7 ANSWER 14 OF 14 EMBASE

ACCESSION NUMBER: 2004444353 EMBASE
TITLE: Silica morphogenesis by alternative processing of silaffins in the diatom Thalassiosira pseudonana.
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AB For almost 200 years scientists have been fascinated by the ornate cell walls of the diatoms. These structures are made of amorphous silica, exhibiting species-specific, mostly porous patterns in the nano- to micrometer range. Recently, from the diatom Cylindrotheca fusiformis unusual phosphoproteins (termed silaffins) and long chain polyamines have been identified and implicated in biosilica formation. However, analysis of the role of silaffins in morphogenesis of species-specific silica structures has so far been hampered by the difficulty of obtaining structural data from these extremely complex proteins. In the present study, the five major silaffins from the diatom Thalassiosira pseudonana (tpSil1H, -1L, -2H, -2L, and -3) have been isolated, functionally analyzed, and structurally characterized, making use of the recently available genome data from this organism. Surprisingly, the silaffins of T. pseudonana and C. fusiformis share no sequence homology but are similar regarding amino acid composition and posttranslational modifications. Silaffins tpSil1H and -2H are higher molecular mass isoforms of tpSil1L and -2L, respectively, generated in vivo by alternative processing of the same precursor polypeptides. Interestingly, only tpSil1H and -2H but not tpSil1L and -2L induce the formation of porous silica patterns in vitro, suggesting that the alternative processing event is an important step in morphogenesis of T. pseudonana biosilica.

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=> s silaffin and polypeptide and silica
L5          20 SILAFFIN AND POLYPEPTIDE AND SILICA

=> l5 and immobilize
L5 IS NOT A RECOGNIZED COMMAND
The previous command name entered was not recognized by the system.
For a list of commands available to you in the current file, enter
"HELP COMMANDS" at an arrow prompt (=>).

=> s l5 and enzyme and protein
L6           3 L5 AND ENZYME AND PROTEIN

=> l5 and protein
L5 IS NOT A RECOGNIZED COMMAND
The previous command name entered was not recognized by the system.
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=> s l5 and protein
L7          14 L5 AND PROTEIN

=> d ibib abs l6 1-3

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